IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Briley-Saebo et al.
Application No.	:	10/018,018
Filing Date	:	April 22, 2002
Art Unit	:	3737
Title	:	Method of Magnetic Resonance Imaging
Docket No.	:	NIDN-10427

Mail Stop Appeal Brief – Patents
Commissioner for Patents
PO Box 1450
Alexandria VA 22313-1450

APPEAL BRIEF

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest in this Appeal is Amersham plc (now GE Healthcare Limited, a part of General Electric "GE").

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences related to the instant appeal.

III. STATUS OF CLAIMS

Claims 14-30 are pending in this application. The Examiner has rejected all of these claims. Claims 14-30 as amended during prosecution are reproduced in the **Claims Appendix** attached hereto. Appellants are appealing the rejections of Claims 14-30.

IV. STATUS OF AMENDMENTS

Appellants filed a Response on February 6, 2007 and a final Office Action was mailed on March 12, 2007. No claims were amended subsequent to the Examiner's final rejection that was mailed on March 12, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1 describes a method of interventional or intraoperative MRI wherein an invasive device is inserted into the vasculature of a human or non human animal body or through vascularised tissue in said body, and an MR image generated of at least a part of said body containing said device and said body being administered with a blood pool contrast agent, the improvement comprising administering the blood pool contrast agent by i.v. injection

directly into the body and using imaging procedure signals generated from the blood pool contrast agent surrounding said device so as to visualize said device on said MR image to guide the placement of the devices in the body.

Support for claim 1 can be found on page 4, lines 2-13 of the specification.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues for review in this appeal arise from a Final Rejection that was mailed on March 12, 2007. The Examiner rejects claims 14-15, and 25 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,819,728 ("Kuhn") in view of U.S. Patent No. 5,553,619 ("Prince") or U.S. Patent No. 5,382,421 ("White").

The Examiner rejects claims 16-24 under 35 U.S.C. § 103(a) as being unpatentable over Kuhn in view of Prince or White and further in view of WO 97/25073 ("Gunther").

The Examiner rejects claims 26-27 under 35 U.S.C. § 103(a) as being unpatentable over Kuhn in view of Prince or White and further in view U.S. Patent No. 6,045,775 ("Ericcson").

The Examiner rejects claims 28-30 under 35 U.S.C. § 103(a) as being unpatentable over Kuhn in view of Prince or White and further in view U.S. Patent No. 5,560,360 ("Filler").

Claims 15-30 are dependent on claim 14 and inherit all the limitations set forth in claim 14. Therefore, the issues in this appeal are:

1. Whether Kuhn in view of Prince or White disclose, teach, or suggest all the elements of claims 14-15, and 25?

VII. ARGUMENT

The Examiner rejects claims 14-15, and 25 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,819,728 ("Kuhn") in view of U.S. Patent No. 5,553,619 ("Prince") or U.S. Patent No. 5,382,421 ("White").

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The Examiner rejects claims 28-30 under 35 U.S.C. § 103(a) as being unpatentable over Kuhn in view of Prince or White and further in view U.S. Patent No. 5,560,360 ("Filler").

Appellants respectfully request that The Board of Patent Appeals and Interferences ("Board") should reverse the Examiner's rejections for the reasons set forth below.

A. The Examiner's Rejections of the Claims 14-15, and 25 Should be Reversed Since Kuhn in view of Prince or White Fail to Teach All the Elements of the Claims

Before discussing the specific differences between the prior art and the present invention, Appellants respectfully submit that it is impermissible within the framework of 35 U.S.C. §103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443 (Fed. Cir. 1986). (emphasis added).

On page 2 of the final Office Action dated March 12, 2007 ("Office Action"), the Examiner states "It would have been obvious to one skilled in the art to have modified Kuhn such that the blood pool contrast agent is administered by IV injection." Appellants respectfully disagree.

The object of the instant invention is to guide the placement of an invasive device through the vasculature of the body. This is done by first introducing a contrast agent into the vasculature, then introducing the invasive device into the vasculature and then creating an MR image to visualize the device and to facilitate guiding the placement of the device in the body.

Visualizing and guiding the placement of an invasive device is also mentioned in

Kuhn. Kuhn, however, solves this problem by filling the device itself with a contrast agent. Kuhn, unlike the present invention, does not visualize or guide the placement of the invasive device with contrast agent in the surroundings.

Kuhn neither discloses, teaches, or suggests that the solution can be achieved by injecting a contrast agent to the part of the vasculature that is surrounding the device. In fact, Kuhn clearly states that it is highly undesirable to reproduce blood flowing around the device within the artery in high-resolution MR images, (see column 4, lines 37-41).

Accordingly, the claims of the present invention can not then be merely assumed obvious from the Examiner's subjective view point. Appellants note that "the prior art itself must provide a motivation or reason for the worker in the art, without the benefit of the Applicant's specification, to make necessary changes in the reference device". See, *Ex parte Chicago Rawhide Manufacturing Co.*, 226 U.S.P.Q. 438 (PTO Bd. App. 1984).

Furthermore, Appellants respectfully point out here that it is well settled in the law that a reference must be considered not just for what it expressly teaches, but also for what it fairly suggests to one who is unaware of the claimed invention. *In re Baird*, 16 F.3d 380, (Fed. Cir. 1994).

Additionally, even assuming, *arguendo*, that the references are properly combinable; Appellants respectfully submit that any such combination would teach away from

the present invention. 'Teaching away' simply means teaching a solution that would not lead to the claimed subject matter. As noted by the Federal Circuit:

> A reference may be said to teach away when a person of ordinary skill, upon [examining] the reference would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. (emphasis added).
>
> *Para-Ordnance Mfg. v. SGS Importers Int'l*, 73 F.3d 1085 (Fed. Cir. 1995).

Appellants respectfully submit again that Kuhn clearly states that it is highly undesirable to reproduce blood flowing around the device within the artery in high-resolution MR images, (see column 4, lines 37-41). Kuhn thereby teaches away from visualizing the device by enhancing the relaxation properties of the blood relative to the invasive device. Kuhn does not disclose, teach, or suggest using a contrast agent to enhance the relaxation properties of the blood surrounding the device.

According to Kuhn, only when the device has been placed correctly in the body, the contrast agent can be injected from the device to the vasculature surrounding the device. This injection of the contrast agent serves a completely different purpose than visualizing the device and safely guiding the placement of the device. As an example, according to Kuhn, the reason for injecting the contrast agent to the vasculature can be to form images of the coronary arteries (see column 10, lines 29-33). Even though the injection is done for a different reason than visualizing and guiding the placement of the device, the device will inherently be visualized. By following the teaching of Kuhn, the device will only be visualized when it has already been placed correctly in the body. In the present invention the injection of contrast agent and

visualization of the device takes place before the device has been placed correctly, in order to achieve correct placement of the device. This is clearly pointed out by the present claim 14 stating that "using imaging procedure signals…..so as to visualize said device on said MR image to guide the placement of the device in the body". Even though the method of Kuhn inherently visualizes the invasive device when it has been placed correctly, it would not be obvious to the person skilled in the art that such visualization by injecting a contrast agent to the vasculature could be used to guide the actual placement of the device in the body.

Additionally, on page 2 of the Office Action, the Examiner holds that it would be obvious to one skilled in the art to modify Kuhn such that the blood pool contrast agent is administered by i.v. injection, and that such a modification involves the substitution of one known method for administering a contrast agent to an area surrounding the catheter tip for another. Appellants hold that Kuhn does not teach a method of administrating a contrast agent to the area surrounding an invasive device for the purpose of visualizing and guiding the placement of the device. By modifying Kuhn such that the contrast agent is administered to the area surrounding the device in an alternative way, one would not achieve the object of guiding the placement of the device because the device would already have been placed correctly in the body. For the purpose of guiding the placement of the device in the body Kuhn only suggests keeping the contrast agent inside the device. Without thinking of achieving the same objective by injecting contrast agent to the vasculature surrounding the device, one would not look to find alternative methods of administrating a contrast agent to the vasculature of a body. In other words, one would not look to Prince or White teaching a method of administering a contrast agent to the vasculature by i.v. injection.

Furthermore, Appellants again hold that Kuhn does not suggest visualizing and guiding the placement of an invasive device by injecting a contrast agent to the vasculature surrounding the device rather than into the device itself. Kuhn administers a contrast agent to the vasculature after the device is placed correctly in the body, whereas the present invention involves administering the contrast agent to the vasculature in order to place the device in the body.

Accordingly, as disclosed in the present invention, the guiding of the placement of an invasive device in the body in this specific way involves an unobvious step.

Appellants therefore respectfully request that the Board should reverse the Examiner's obviousness rejection of claims 14-15 and claim 25.

Claims 16-24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn in view of Prince or White, and further in view of Gunther. This rejection is respectfully traversed. Claims 16-24 are all dependent on claim 14 and inherit all the limitations set forth in claim 14. Accordingly, Appellants respectfully submit that replacing the contrast agent of Kuhn with the contrast agent disclosed by Gunther would not lead to the instant invention.

Appellants therefore respectfully request that the Board should reverse the Examiner's obviousness rejection of claims 16-24.

Claims 26-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn in view of Prince or White, and further in view of Ericcson. This rejection is respectfully traversed. Claims 26-27 are both dependent on claim 14 and inherit all the limitations set forth in claim 14. Accordingly, Appellants respectfully submit that modifying Kuhn such that the imaging sequences taught by Ericcson would not lead to the instant invention.

Appellants therefore respectfully request that the Board should reverse the Examiner's obviousness rejection of claims 26-27.

Claims 28-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn in view of Prince or White, and further in view of Filler. This rejection is respectfully traversed. Claims 28-30 are all dependent on claim 14 and inherit all the limitations set forth in claim 14. Accordingly, Appellants respectfully submit that modifying Kuhn such that the contrast agent includes iron oxide and flip angles and echo times as set forth in Filler would not lead to the instant invention. Reconsideration and withdrawal of the rejection are respectfully requested.

Appellants therefore respectfully request that the Board should reverse the Examiner's obviousness rejection of claims 28-30.

CONCLUSION

In view of the foregoing, Appellants respectfully request that the Board reverse the rejections of Claims 14-30 as set forth in the Office Action mailed March 12, 2007, that the Board allow the pending claims since they are in condition for allowance, and that the Board grant any other relief as it deems proper.

Dated: August 07, 2007

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1-13 (Cancelled)

14. In a method of interventional or intraoperative MRI wherein an invasive device is inserted into the vasculature of a human or non human animal body or through vascularised tissue in said body, and an MR image generated of at least a part of said body containing said device and said body being administered with a blood pool contrast agent, the improvement comprising administering the blood pool contrast agent by i.v. injection directly into the body and using imaging procedure signals generated from the blood pool contrast agent surrounding said device so as to visualize said device on said MR image to guide the placement of the devices in the body.

15. The method of claim 14 wherein said device is selected from the group consisting of catheters, balloons, optical fibres, guide wires, needles, biopsy needles, electrodes, electrode leads, implants, stents and stent grafts.

16. The method of claim 14 wherein said blood pool contrast agent comprises compounds selected from the group consisting of MS-325, carboxymethyl dextran GdDTPA conjugates, GdDTPA polylysine conjugates, cascade polymers, dendrimer polymers, superparamagnetic iron oxides, ultrasmall superparamagnetic iron oxides and carbohydrate stabilised iron oxide particles.

17. The method of claim 16 wherein said blood pool contrast agent comprises superparamagnetic iron oxide particles having on their surfaces degraded starch.

18. The method of claim 17 wherein said blood pool contrast agent further comprises a hydrophilic polymer.

19. The method of claim 18 wherein said hydrophilic polymer is a functionalized polyalkylene oxide.

20. The method of claim 14 wherein a difference in at least one parameter chosen from T_1, T_2 and T_2* between the blood and said device is utilized to generate image contrast between the blood and said device.

21. The method of claim 14 wherein said device is filled with a diamagnetic material or a paramagnetic material.

22. The method of claim 14 wherein said blood pool contrast agent enhances T_1 and/or T_2* relaxation properties of the blood relative to that of said device.

23. The method of claim 22 wherein the T_1 relaxation property of the blood is enhanced relative to said device; T_1-weighted sequences are used and said device is filled with diamagnetic material so that the blood appears bright in said image, relative to said device.

24. The method of claim 22 wherein the T_2* relaxation property of the blood is enhanced relative to said device; T_2*-weighted sequences are used and said device is filled with paramagnetic material so that said device appears bright in said image, relative to the blood.

25. The method of claim 14 wherein said device is not marked with a magnetic susceptibility agent.

26. The method according to claim 14 wherein the imaging procedure signals are T1 or T2* weighted spin echo or gradient echo sequences.

27. The method according to claim 14 wherein the imaging procedure signals are gradient echo or echo planar imaging procedures.

28. The method according to claim 14 wherein said blood pool contrast agent is an iron oxide blood pool MR contrast agent and the imaging procedure signals involves gradient echo imaging using small flip angles and short echo times or gradient echo imaging using larger flip angles and longer echo times.

29. The method according to claim 28 wherein the small flip angle is 10 to 45 degrees and the short echo times are 0.5 to 5 ms.

30. The method according to claim 28 wherein the larger flip angles are 55 to 75 degrees and the longer echo times are 6 to 20 ms.

IX. EVIDENCE APPENDIX

Appellants hereby list the following patents that the Examiner cites against the present invention:

U.S. Patent No. 5,819,728 ("Kuhn");

U.S. Patent No. 5,553,619 ("Prince");

U.S. Patent No. 5,382,421 ("White");

WO 1997/25073 ("Gunther");

U.S. Patent No. 6,045,775 ("Ericcson"); and

U.S. Patent No. 5,560,360 ("Filler").

This is the evidence relied upon by the Examiner for rejection of appealed Claims 14-30 in the Office Action dated March 12, 2007.

X. RELATED PROCEEDINGS APPENDIX

There are no other appeals or interferences related to the instant appeal.